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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,770	08/27/2003	Ram Gopal Lakshmi Narayanan	60282.00101	4039

32294 7590 09/06/2007

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EXAMINER	
DINH, MINH	

ART UNIT	PAPER NUMBER
2132	

MAIL DATE	DELIVERY MODE
09/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

MN

Office Action Summary	Application No.	Applicant(s)	
	10/648,770	NARAYANAN, RAM GOPAL LAKSHMI	
	Examiner	Art Unit	
	Minh Dinh	2132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is in response to the amendment filed 06/14/07. Claims 1-4, 6, 8-10, 12-13, 17, 32-33 and 36 have been amended; claims 38-41 have been added.

2. Applicant states that a new PTO-1449 form is provided with the amendment (Remarks, page 15, 3rd paragraph); however, a record of the document cannot be found.

Response to Arguments

3. Applicant's arguments filed 06/14/07 have been fully considered but they are not persuasive.

With respect to the rejections of claims 1-32 under 35 USC 112, first paragraph, for failing to comply with the enablement requirement, Applicant argues that the present specification does not indicate nor require that public and private keys are different (page 15, last paragraph). However, it is fundamental to the public-key system that the public key and the private key of an entity are different keys so that the public key is distributed to the public and anyone can use it, and that the private key is known only to the entity. One of ordinary skill in the art of cryptography would readily

recognize that two keys would not be labeled public and private keys unless they were different keys.

With respect to the rejections of claim 1 under 35 USC 102(b) as being anticipated by Moy ("RFC 2328 – OSPF Version 2"), Applicant argues that Moy does not disclose the steps of sending multicast messages on at least one multicast channel to other nodes, providing a further specific multicast channel for sending start messages by the nodes to the other node, sending a start message on the specific multicast channel by using a start node, wherein the start node starts an operation or an application, and validating an authenticity of the start message upon receipt of the start message at the receiving node (page 19, 1st paragraph). Moy discloses a routing method/protocol and system comprising (i) sending/receiving routing update messages among nodes (i.e., routers) using multicast (Section 1, Introduction; Section 8.1, Sending Protocol Packets); (ii) providing a further specific multicast channel for sending start messages (i.e., Hello messages) by the nodes to the other nodes, sending a start message on the specific multicast channel by using a start node, wherein the start node starts an operation or an application (Section 4, Functional Summary; Section 7.1, The Hello Protocol; Section 9.5, Sending Hello Packets); and (iii) validating an authenticity of the start message upon receipt of the start message at the

receiving node (Section A.3.2, The Hello Packet; Section D.3, Cryptographic Authentication; Section D.5.3, Verifying Cryptographic Authentication).

With respect to the rejections of claim 1 under 35 USC 102(b) as being anticipated by (i) Murphy et al. ("Digital Signature Protection of the OSPF Routing Protocol") as evidenced by Moy, and (ii) Nguyen et al. (2002/0016926) as evidence by Moy, Applicant argues that any rejection which requires a combination of two references should be an obvious rejection under 35 USC 103, and not an anticipation rejection under 35 USC 102. According to the MPEP, a 35 USC 102 rejection over multiple references has been held to be proper when the extra references are cited to show that a characteristic not disclosed in the reference is inherent (MPEP § 2131.01). Both Murphy and Nguyen disclose utilizing OSPF routing protocol. Although Murphy and Nguyen do not disclose certain claimed features, Moy discloses that these features are part of the OSPF routing protocol. Therefore, Moy is cited to show that the features are inherent, and the rejections are proper.

Information Disclosure Statement

4. There are no copies in record for references AN and AO listed in the information disclosure statement filed 11/16/05. Applicant is requested to submit those documents in the next response.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Regarding claim 1, it recites the limitation "sending a start message on said specific multicast channel by using a start nodes, wherein the start node starts an operation or an application; receiving at a receiving node the start message; and validating an authenticity of the start message upon receipt of the start message at the receiving node" in lines 8-12. The specification discloses that the start node R1 generates a digital signature DS1 for the start message by encrypting the source address and a random value using the private key of R1, i.e., DS1=Enc (Source Address, Random Value, Private Key of Router 1) (paragraphs 0040-0045). The specification then discloses that the receiving node R2 receives the start message together with signature DS1 and validates the authenticity of the start message by: generating a digital signature DS2 by encrypting the source address and the

random value retrieved from the start message using the public key of R1, i.e., DS2=Enc (Source Address, Random Value, Public Key of Router 1); comparing DS1 and DS2, and determining that the start message is authentic if DS1=DS2 (paragraphs 0046-0048). However, it is well known in cryptography art that the values of the public key and the private key of a public/private key pair are not supposed to be the same. As a result, the signatures DS1 and DS2 disclosed in the specification would never be the same when the private key and the public key used in the process are valid keys and that the start message is authentic. Thus, the disclosure fails to enable one skilled in the art to make and use the claimed invention. Claim 17 is rejected on the same basis as claim 1. Claims that are not specifically addressed are rejected by virtue of their dependency.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 5-6, 17-19, 21-22, 33-35 and 37-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Moy ("RFC 2328 – OSPF Version 2").

Moy discloses a method performed in a communication system including a plurality of nodes, i.e., routers implemented in OSPF routing protocol, communicating in a shared network segment and at least one multicast channel in said shared network segment (Section 1, Introduction; figure 1a, Broadcast networks), the method comprising: sending multicast messages from nodes on at least one multicast channel to other nodes (Section 1, Introduction; Section 4.3, Routing protocol packets; Section 4.4, Basic Implementation Requirements); providing a further specific multicast channel for sending start messages by the nodes to said other node; sending a start message, i.e., a hello message, together with a signature of the start message on said specific multicast channel by using a start node, wherein the signature is generated by the start node using a key, and wherein the start node starts an operation or an application (Section 7.1, The Hello Protocol; Section 9.3, The Interface State Machine; Section A.3.2, The Hello Packet; Section D.3, Cryptographic Authentication); receiving at a receiving node the start message; and validating an authenticity of the start message using the signature upon receipt of the start message at the receiving node (Section D.5.3, Verifying Cryptographic Authentication; Security Consideration at the end of the paper).

9. Claims 1-6, 17-22, 33-35 and 37-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Murphy et al. ("Digital Signature Protection of the OSPF Routing Protocol") as evidenced by Moy ("RFC 2328 – OSPF Version 2"). Murphy discloses protection of routing information exchanged between routers in OSPF routing protocol using digital signature (Abstract). Specifically, Murphy discloses that when a sending router sends routing information message to a receiving router, the sending router signs the message using its private key so that the receiving router can verify the signature using the public key of the sending router to determine the authenticity of the message (Section 4, Using digital signature in OSPF). Murphy does not explicitly disclose multicasting different kinds of messages including a hello message; however, Moy discloses that this feature is inherent to the OSPF routing protocol (Section 1, Introduction; Section 4.3, Routing protocol packets; Section 7.1, The Hello Protocol; Section 9.3, The Interface State Machine; Section A.3.2, The Hello Packet).

10. Claims 1-8, 10-12, 17-24, 26-28 and 33-41 are rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen et al. (2002/0016926) as evidence by Moy ("RFC 2328 – OSPF Version 2").

Regarding claims 1-6, 17-22, 33-35 and 37-40, Nguyen discloses a method and system for securely exchanging routing information among

routers, i.e., secure gateway devices (SGDs), in OSPF routing protocol using encryption (Abstract; paragraphs 0088, 0101). Specifically, Nguyen discloses that when a sending router sends routing information message to a receiving router, the sending router encrypts the message using an encryption key (paragraphs 0102, 0104-0105). Murphy does not explicitly disclose multicasting different kinds of messages including a hello message; however, Moy discloses that this feature is inherent to the OSPF routing protocol (Section 1, Introduction; Section 4.3, Routing protocol packets; Section 7.1, The Hello Protocol; Section 9.3, The Interface State Machine; Section A.3.2, The Hello Packet).

Regarding claims 7-8, 10, 23-24, 26, 36 and 41, Nguyen does not explicitly disclose sending the multicast messages from the nodes comprising routers including a Designated Router and other routers; deciding that the Designated Router comprises an only available node in a shared segment if the Designated Router does not receive a response or the start message from the other nodes when only the Designated Router comprises an active node in a shared network segment; however, Moy discloses that this feature is inherent to the OSPF routing protocol (Section 1.2, Definitions of Commonly Used Terms; Section 4.3, Routing protocol packets; Section 7.1, The Hello Protocol; Section 7.3, The Designated Router). Nguyen further discloses generating a session key for encrypting

multicast routing information, e.g., routing updates, using ISAKMP (paragraphs 104-105, 110-111).

Regarding claims 11-12 and 27-28, Nguyen further discloses engaging in Internet Key Exchange (IKE) protocol between routers involved in a communication session to generate security associations (paragraphs 0024-0025, 0105, 0119). Nguyen also discloses secure multicast communication among routers (paragraphs 0110-0111). Inherently, security associations used for unicast communication are different from those used for multicast communication.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 13-15 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen as evidence by Moy as applied to claims 1 and 17 above, and further in view of Srivastava et al. (7,103,185). Nguyen discloses using security associations for unicast/multicast communication between routers (paragraphs 0104-0105, 0110). Nguyen does not explicitly

disclose a Designated Router and a Backup Designated Router connected (i.e., adjacent) to each other and to other routers in the network; however, Moy discloses that this feature is inherent to the OSPF routing protocol (Section 7.3, The Designated Router; Section 7.4, The Backup Designated Router). Nguyen does not disclose changing the session key for a multicast group when a new member joins the multicast group or when a member leaves the multicast group. Srivastava discloses a method for management of session keys in a multicast group comprising generating a new session key for a multicast group by a designated member when a new member joins the multicast group or when a member leaves the multicast group (col. 2, lines 58-67; figures 4B-C; col. 11, line 50 – col. 12, line 45). Srivastava also discloses generating a new session key for a multicast group when a member leaves the multicast group (col. 2, lines 58-67). It would have been obvious to one of ordinary in the art at the time the invention was made to modify the Nguyen method to change the session key for a multicast group when a new member joins the multicast group or when a member leaves the multicast group, as taught by Srivastava. The motivation for doing so would have been to prevent the new member from decrypting past messages and the member who leaves from deciphering future messages of the multicast group.

13. Claims 9 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen as evidence by Moy as applied to claims 7 and 23 above, and further in view of Kaliski, Jr. (6,085,320). Nguyen, discloses using ISAKMP (Internet Security Association and Key Management Protocol) (paragraph 0105). Inherent to ISAKMP, each party in a two-party communication session generates a session key using a random number, its own private key and the other party's public key (according to Diffie-Hellman algorithm); however, a timestamp is not used to generate the session key in ISAKMP. Kaliski discloses using a timestamp (i.e., a time-varying value) in generating a session key (col. 5, lines 34-38). It would have been obvious to one of ordinary in the art at the time the invention was made to modify the Nguyen method to use a timestamp in generating the session key, as taught by Kaliski, in order to prevent replay attack.

Allowable Subject Matter

14. Claims 16 and 32 are not rejected over prior art.

15. The following is a statement of reasons for the indication of allowable subject matter. Regarding claims 16 and 32, the limitations "generating using a Designated Router a new group key for all nodes when new Open Shortest Path First nodes join a network; first distributing the new group key

to a Backup Designated Router using the Designated Router; next using the Designated Router and the Backup Designated Router to distribute the new key to all other nodes using respective unicast security association messages", in combination with elements of the parent claims, have not been taught by prior art. The closest prior art, Harney et al. ("RFC 2094 – Group Key Management Protocol (GKMP) Architecture"), discloses that the designated group controller of a group either distributes a group key to each group member or broadcast the key to the group (Section 2.2.1); however, Harney does not disclose using help from a backup group controller in distributing the group key to each node.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Menezes et al., "Handbook of Applied Cryptography"

Schneier, "Applied Cryptography"

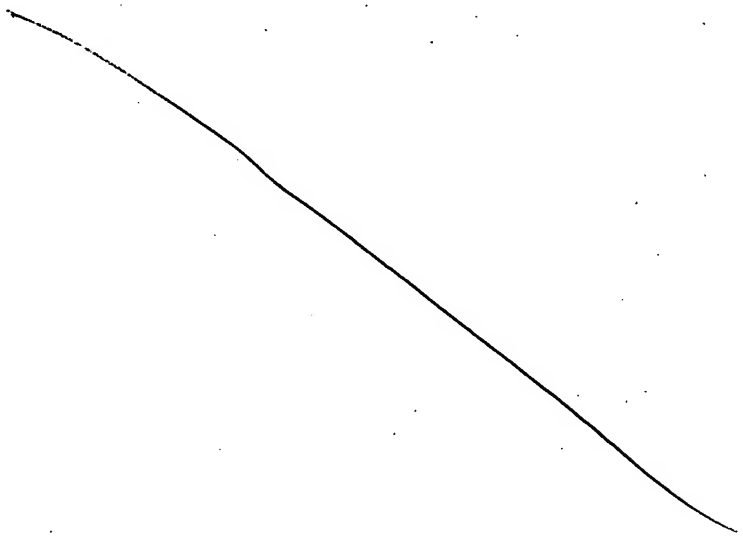
17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a

first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Dinh whose telephone number is 571-272-3802. The examiner can normally be reached on Mon-Fri: 10:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on 571-272-3799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MD/
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09/01/07

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